

# Cosmogenic Neutrinos Challenge the Cosmic Ray Proton Dip Model

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We fit the recent UHECR spectrum measurements from the Telescope Array experiment under the assumption of pure proton composition, as assumed by the proton dip model.

We present a full scan of the three main physical model parameters of UHECR-injection: source redshift evolution, injected maximal proton energy and spectral power-law index. We discuss how the result qualitatively changes compared to earlier two-parameter fits in the literature: a mild preference for a maximal energy cutoff at the sources instead of the Greisen–Zatsepin–Kuzmin (GZK) cutoff, hard injection spectra, and strong source evolution.

We show that the predicted neutrino flux exceeds the IceCube limit for any parameter combination. As a result, the proton dip model is challenged at more than 95% C.L.

This is strong evidence against the dip-model independent of mass composition measurements.

## Summary

**Primary author:** HEINZE, Jonas (DESY)

**Co-authors:** BUSTAMANTE, Mauricio (Ohio State University); WINTER, Walter (DESY); BONCIOLI, Denise

**Presenter:** HEINZE, Jonas (DESY)

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